Fluorescence Measurements of Aromatic Amino Acids in the Presence of Lipid Membranes

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Amphiphilic peptides are capable of finding their way to, and occasionally through, cellular membranes using a mechanism that includes specific amino acid sequences. Physical measurements of amino acid-lipid interactions are of interest for a quantitative description of peptide affinities to biological membranes. In this study, we investigate small peptide-lipid interactions using the fluorescence of the aromatic amino acids tyrosine (Tyr), tryptophan (Trp) and phenylalanine (Phe). Reference spectra in deuterated isopropanol solutions are obtained to mimic hydrophobic environments and are used to quantify the interaction of Lys-Tyr-Lys, Trp-Gly, and Gly-Phe with 1,2-dioleoyl-sn-glycero-3-phosphocholine (DOPC) and palmitoyl-oleoyl phosphatidylserine (POPS) lipid membranes. These fluorescence data complement previously reported UV absorption data and have the advantage of eliminating background and scatter from solution. Together with NMR data, these results can be used to more fully characterize lipid-aromatic amino residue interactions.

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